On becoming edentulous. An investigation into the dental and behavioural reasons for full mouth extractions.

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Chapter seven

THE RELATIVE IMPORTANCE OF PERIODONTAL DISEASE FOR FULL MOUTH EXTRACTIONS IN THE NETHERLANDS[1]

7.1 Introduction

Whether or not teeth are lost because of periodontal disease or caries is a topic which continuously draws attention. Contradictory to former opinions recent publications indicate that periodontal diseases do not affect many persons seriously enough to cause tooth loss (1-3).

Little information is available about the role periodontal disease plays in full mouth extractions. Todd & Whitworth (4) found that among people who went straight to full clearance, no periodontal disease was present. In an investigation in a medium-sized city in The Netherlands (5) it was found that 17% of the patients showing up for full mouth extractions had generalized advanced periodontal disease. Above the age of 55 years 37% had serious periodontal disease, which means that even at an older age periodontal disease could not be identified as the main clinical condition leading to full mouth extractions. Next to caries and periodontal disease, non-disease factors such as the patient's wish, anxiety, financial reasons etc. may play a role in full mouth extractions (4, 6, 7). These factors are supposed to be present when caries or periodontal disease cannot be identified as a reason for full mouth extractions.

In order to determine the relative importance of reasons for

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full mouth extractions a combined sociodental study was carried out in both an urban and a rural area in The Netherlands. In this chapter the periodontal condition in the rural area at the moment of full mouth extractions will be described and compared with the findings from the urban area. Subsequently, attention will be given to the relative importance of periodontal disease compared with caries and non-disease reasons in the combined urban and rural group of patients.

7.2 Materials and methods

7.2.1 General method

The first part of this study was carried out in the city of Groningen (170 000 inhabitants) in 1982 and was repeated in a rural area (150 000 inhabitants) in 1983. In 1981 the dentist-population ratio in the urban area was about 1:2500; in the rural area 1:5700. The two areas were chosen because it was expected that edentulousness would vary with the availability and accessibility of dental services (8). All the dentists in these areas were asked to participate. In Groningen 91% and in the rural area 92% of the dentists participated. The dentists were asked to collect from patients receiving full mouth extractions the extracted teeth in jars containing a 10% formaline solution and to fill out a short questionnaire concerning the reasons (or diagnosis) for full mouth extractions.

The dentists also asked their patients to fill out a questionnaire at home concerning the underlying reasons for the patients to decide to have all their teeth extracted. All the patients who received full mouth extractions during one year participated regardless of whether they already had partial dentures. Details about the assessment of the perio-

dontal and caries status have been described in chapters three and four (5, 9).

7.2.2. The comparison of groups based on the dental condition

To answer the question whether people lost their teeth because of caries, periodontal disease or non-disease reasons, it was necessary to combine the caries and the periodontal scores of the patients. To that end the percentage of the teeth with loss of attachment of 50% or higher (L.A.>50%) was subdivided in four groups: 1-25% of the teeth with L.A.>50%, 26-50% etc. The same procedure was repeated for the percentage of decayed teeth (i.e. one or more D-surfaces per tooth). Cross-tabulations of the two variables revealed that four clearly distinguishable groups could be made. Group 1 (relatively healthy) were those who had less than 25% of the teeth with caries and/or less than 25% of the teeth affected by periodontal disease (n=59). Group 2 (caries and periodontal disease) consisted of patients who had between 25 and 50% of their teeth affected by both diseases (n=47). Group 3 (predominantly caries) were patients with more than 50% of their teeth decayed and with no or little periodontal disease (<25%; n=206). Group 4 (predominantly periodontal disease) were patients with more than 50% of their teeth with L.A.>50% and with little or no caries (<25%; n=48).

7.3 Results

7.3.1. The periodontal status in the rural area

In the vast majority of the teeth hardly any periodontal loss of attachment was found (Fig. 7.1).

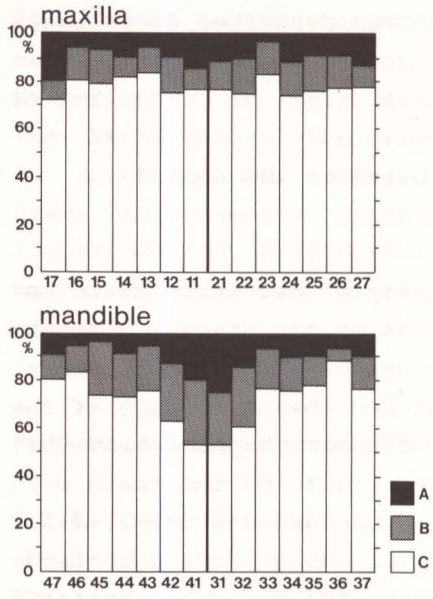

Fig. 7.1 Percentage of people with varying degrees of loss of attachment (L.A.) for maxilla and mandible. A, percentage of people with teeth with L.A.>50%. B, percentage of people with teeth with L.A. 30-50%. C, percentage of people with teeth with L.A. <30%.

Advanced periodontal disease, i.e. L.A. of 50% or higher, was rare. The teeth 41 and 31 appeared to be most at risk: about 50% of these teeth had a L.A. measurement of 30% or higher. Advanced generalized periodontal disease, defined as 50-100% of the teeth of a person with L.A. >50%, was concentrated in 9% of the patients (Table 7.1). In 62% of the patients no teeth with L.A.>50% were found. Advanced generalized periodontal disease correlated significantly with age (Table 7.2). In patients of 35 years and younger 89% did not have any teeth with L.A.>50%. In the group of 55 years and older this figure was 25%. In Table 7.3 more detailed information is given about the relationship between the periodontal condition of individual teeth and age. It is shown that ageing coincides with decreasing average numbers of teeth present together with increasing numbers of teeth with periodontal breakdown.

There was no significant relationship between the number of teeth affected by periodontal disease (L.A.>50%) and level of education. Also the presence of partial dentures made no difference. Males had more teeth with L.A.>50% than females (1.8 versus 0.7 resp.; $t=2.9139$, $p<0.01$). This relationship

Table 7.1

Average number of teeth with L.A.>50% and average number of teeth present at the moment of extraction according to percentage of teeth with L.A.>50% and number of patients.

Percentage of teeth with L.A. >50%	No.of patients		Average no.of teeth with L.A. >50%[1]		Average no. of teeth present[1]	
	n	(%)	$\bar{x}$	(SD)	$\bar{x}$	(SD)
0%	144	(62.1)	-	(-)	13.2	(6.9)
1-25%	44	(19.0)	1.6	(1.0)	12.9	(5.9)
26-50%	23	(9.9)	3.9	(2.1)	9.7	(4.8)
51-75%	14	(6.0)	6.1	(2.6)	9.9	(4.0)
76-100%	7	(3.0)	7.3	(5.5)	8.0	(6.5)
Total	232[2]	(100%)	1.3	(2.4)	12.4	(6.5)

[1]) Third molars excluded

[2]) Missing values: 4.

was also significant when considering age and dental attendance pattern (second order partial correlation; r=-.1752. p=<0.01).

No significant differences existed between regular and irregular attenders: 50% of the regular and 63% of the irregular attenders had no teeth with L.A.>50% (X^2=1.5914, 1 df, n.s.). Between regular and irregular attenders the total number of teeth did not differ significantly. In Table 7.4 the relationship is shown between the caries status of individual teeth and their periodontal condition.

Table 7.2

Distribution of patients according to presence of advanced periodontal disease (L.A.>50%) and age

Age	Patients without advanced periodontal disease		Patients with less than 50% of the dentition with advanced periodontal disease		Patients with more than 50% of the dentition with advanced periodontal disease		Total	
	n	(%)	n	(%)	n	(%)	n	(%)
< 35	65	(89.0)	7	(9.6)	1	(1.4)	73	(100.0)
35-54	35	(47.3)	28	(37.8)	11	(14.9)	74	(100.0)
≥ 55	8	(25.0)	19	(59.4)	5	(15.6)	32	(100.0)
Total	108	(60.3)	54	(30.2)	17	(9.5)	179[1]	(100.0)

X^2=47.6, 4 df, p<0.00.

[1]) Because information regarding age was derived from the questionnaire, the total n dropped from 236 to 179 (because of non-response and missing values)

Table 7.3

Distribution of teeth according to number of teeth with varying degrees of loss of attachment (L.A.), total number of teeth, average number of teeth with L.A.>50%, average number of teeth present and age

Age	No. of patients	No. of teeth with L.A. of: 0-30%		30-50%		>50%		Total no. of teeth		Average no. of teeth with L.A.>50%		Average no. of teeth present	
	n	n	(%)	n	(%)	n	(%)	n	(%)	$\bar{x}$	(SD)	$\bar{x}$	(SD)
< 35	73	1042	(92.3)	61	(5.4)	26	(2.3)	1129	(100)	0.4	(2.2)	15.5	(6.5)
35-54	74	460	(56.7)	213	(26.3)	138	(17.0)	811	(100)	1.8	(2.6)	11.0	(5.9)
≥ 55	32	136	(44.9)	94	(31.0)	73	(24.1)	303	(100)	2.3	(2.3)	9.5	(4.3)
Total	179[1]	1638	(73.0)	368	(16.4)	237	(10.6)	2243	(100)	1.3	(2.4)	12.4	(6.5)

X^2=447.6, 4 df, p<0.00

[1]) Missing data because of non-response to questionnaire and missing values.

Table 7.4

Distribution of teeth according to varying degrees of loss of attachment (L.A.) and caries-status

Caries-status	No. of teeth with:[1] L.A. 0-30%		L.A. 30-50%		L.A. >50%		Total	
	n	(%)	n	(%)	n	(%)	n	(%)
1. sound	767	(36.4)	261	(56.3)	170	(58.0)	1198	(41.8)
2. 1-2 carious surfaces	352	(16.7)	60	(12.9)	53	(18.1)	465	(16.2)
3. 3-5 carious surfaces	299	(14.2)	57	(12.3)	18	(6.1)	374	(13.1)
4. extraction indicated	140	(6.6)	19	(4.1)	13	(4.4)	172	(6.0)
5. filled and otherwise sound	222	(10.5)	38	(8.2)	24	(8.2)	284	(9.9)
6. filled but with primary caries	119	(5.6)	5	(1.1)	6	(2.0)	130	(4.5)
7. filled but with secondary caries	209	(9.9)	24	(5.2)	9	(3.1)	242	(8.4)
Total	2108	(99.9)	464	(100.1)	293	(99.9)	2865	(99.9)

[1]) Third molars excluded.

In people of 35 years and younger it appeared that teeth which were in a relatively good periodontal condition (<30% L.A.) were most affected by caries. Above the age of 35 years there was no relationship between caries and degree of L.A.

7.3.2 The urban-rural comparison

When the periodontal condition of individual teeth in the rural area (Fig. 7.1) was compared with the periodontal condition in the urban area (5), the same tendency was found: the teeth in the maxilla were in a slightly better condition than in the mandible and the teeth 41 and 31 were most at risk. However, in the rural area 9% of the patients had advanced generalized periodontal disease and in the town this was 17% (5). In both regions about 60% had no teeth with L.A.>50%.

In both the rural and the urban area, there was a significant positive relationship between age and periodontal destruction. In both regions no relationship was found between educational level and periodontal disease. Also the presence of partial dentures made no significant difference to the periodontal condition of the mouth. In the rural area men had on average more teeth with L.A.>50% than women (1.8 versus 0.7 resp.); in the urban area no sex difference were found. In both areas this relationship between sex and periodontal disease did not change when controlling for possible intervening variables like age, dental attendance pattern and educational level. In the urban area irregular attenders were in a better periodontal condition than regular attenders (5). In the rural area there was no significant difference between regular and irregular attenders as to the periodontal condition. Differences regarding age and sex between the groups of patients from the urban and rural area were not responsible for this different relationship.

When considering the relationship between caries and periodontal disease of individual teeth, it appeared that in the rural area there was a negative relationship between caries and periodontal disease in the age group below 35 years. In the urban area this relationship was also found in people between 35 and 54 years old.

7.3.3 The importance of periodontal disease as a reason for full mouth extraction

Based on the criteria described before, the total group has been divided in four sub-groups. In the largest proportion of patients caries was the predominant clinical feature (Table 7.5).

Table 7.5

Patients categorized according to the dental condition at the time of full mouth extraction

dental condition	n	(%)
1. Relatively healthy	59	(16.4)
2. Caries and periodontal disease	47	(13.1)
3. Predominantly caries	206	(57.2)
4. Predominantly periodontal disease	48	(13.3)
Total	360	(100.0)

In only a small group (13%) periodontal breakdown was the predominant characteristic. Caries as well as periodontal disease were the cause of full mouth extractions in another

13% of the cases and 16% appeared to be in an relatively good dental condition.

In Table 7.6 an overview is given of some important characteristics of the four sub-groups.
Referring to population figures, it appeared that those who had predominantly periodontal breakdown were more often regular attenders, were older and had fewer teeth left. Those with predominantly caries were younger and had more often stopped visiting the dentist on a regular basis than could be expected by chance. However, regression analysis pointed out that only age and not dental attendance pattern had a predictive value as to whether or not people lost their teeth because of caries or periodontal reasons. No significant differences were found between the four groups of patients concerning sex, educational level and domicile (urban or rural area).

Table 7.6 also shows that the classification of patients in four groups based on relative criteria (% of teeth with ...) appears relevant. Groups 1 and 2 (Table 7.5) more often had low DMF-T scores, while groups 3 and 4 were characterized by high DMF-T scores. Cross-tabulations of the four groups with the absolute numbers of decayed teeth and teeth with L.A.>50% further supported the validity of the division of the patients in the four groups.

7.4 Discussion

People living in an urban area are usually in a better dental condition than those living in a rural area (8). This also might be true with respect to their periodontal condition. In this study, however, the prevalence of generalized periodontal breakdown was higher in the urban than in the rural area (17% and 9% respectively). This difference in periodontal condition between the urban and the rural area was generally a result of the differences in age structure of

Table 7.6

Dental attendance pattern, age, number of teeth and DMF-T scores in relation to the dental condition at the time of full mouth extraction

	Dental condition:				
	Relatively healthy (n=59) %	Caries and periodontal disease (n=47) %	Predominantly caries (n=206) %	Predominantly periodontal disease (n=48) %	Total group %
Dental attendance pattern[1]					
Regular	30.0+	25.0	11.0-	33.3+	19.4
Regular in the past	30.0-	30.6-	53.2+	30.8-	43.0
Symptomatic	40.0	44.4	35.7	35.9	37.6
	100.0	100.0	100.0	100.0	100.0
Age[1]					
< 35	32.0	8.3-	57.1+	5.0-	38.9
35-54	46.0	47.2	31.2-	42.5	37.5
≥ 55	22.0	44.4+	11.7-	52.5+	23.6
	100.0	99.9	100.0	100.0	100.0

Table 7.6 - continued -

	Dental condition: Relatively healthy (n=59) %	Caries and periodontal disease (n=47) %	Predominantly caries (n=206) %	Predominantly periodontal disease (n=48) %	Total group %
No. of teeth					
< 10	49.2	42.6	42.2	66.7+	46.7
11-15	18.6	25.5	20.9	12.5-	20.0
≥ 16	32.2	31.9	37.4	20.8-	33.3
	100.0	100.0	100.0	100.0	100.0
DMF-T[1]					
< 20	47.5+	53.2+	28.6-	29.2	35.0
21-24	39.0	34.0	35.0	29.2	34.7
25-28	13.6-	12.8-	36.4+	41.7+	30.3
	100.1	100.0	100.0	100.1	100.0

[1]) Significant relationship, $p<0.05$ (X^2 test)

\+ = higher value than expected by chance

\- = lower value than expected by chance.

their respective populations. Therefore, it could be concluded that the varying dentist-population ratios did not seem to have had consequences for the periodontal condition in the populations studied. This finding is supported by the study of Schaub (1), who found that in The Netherlands even in regular dental attenders dental practitioners rarely carry out periodontal treatment.

It was found that in the urban area regular dental attenders showing up for full mouth extractions had more teeth with advanced periodontal disease than irregular attenders (3.2 and 1.4 resp.). In the rural area no differences were found (1.6 and 1.2 resp.). A possible explanation for this might be a mechanism which has been described by Eddie (10). She found that when severely diseased people (i.e. periodontal disease) attended a dentist, they were more likely to receive extractions instead of restorative treatment. Possibly this happens only in the rural area, because in the urban area, with lower dentist-patient ratios, the necessity to extract teeth with only periodontal disease is not so high.

Caries appeared to be the predominant reason for full mouth extractions. A relatively small group (13%) lost their teeth because of periodontal disease. These two groups appeared to be mutually exclusive. People with severe caries did not have generalized periodontal disease and conversely severely periodontal breakdown did not coincide with caries. Persons whose dentitions showed extensive periodontal breakdown at the time of extraction were older and had fewer teeth left than those with predominantly caries. Advanced generalized periodontal disease seems, therefore, to be confined to a relatively small group of people at risk who had lost most of their teeth already in the past. No information is available whether their teeth have been extracted in the past because of periodontal disease.

The patients who showed up for a full clearance while their teeth were relatively healthy are of special interest. In

these patients it might be expected that non-disease (4) or social factors (7) play a role in the decision for full mouth extractions. Social factors which have been sugested as contributing to the demand for full dentures include the following: experiences in the past with dentistry (pain, anxiety), the attitude towards dental health and full dentures, financial reasons etc. (6). In future publications further attention will be given to this subject.

Finally, when looking at the dental reasons for full mouth extractions in the urban and the rural area, the following conclusions can be drawn:

- in both the urban and the rural area and in all age groups caries and not periodontal disease is the predominant reason for full mouth extractions;
- besides caries and periodontal disease, non-disease reasons play a role in the decision for full mouth extractions;
- living in an area with a low dentist-population ratio results in an increased risk of full dentures at early age;
- indications are found that in the urban area more effort was spent in delaying the moment of full mouth extraction;
- considering intervening variables, patients living in areas with a different dentist-population ratio have a comparable caries status and periodontal condition at the moment of full mouth extraction.

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